BOOKS

Power & Politics in Project Management

By Jeffery K. Pinto, Project Management Institute, 1996

Reviewed by LTC Kenneth H. Rose (USA, Ret.), Tidewater-Richmond Area Manager for WPI in Hampton, VA, and former member of the Army Acquisition Corps.

Practitioners of project management may have, on occasion, found themselves walking down the proverbial road with their hand on their head and a bump under it. An insightful, one-of-a-kind book by Jeffery K. Pinto, *Power & Politics in Project Management*, addresses a possible source for this condition.

The book is a progressive march through what could be a minefield. The words *power* and *politics* are often taken as pejoratives, suggesting unpleasant, even repugnant, activities. Pinto's premise is that neither the words nor the activities are intrinsically bad. They are naturally occurring elements of project management that must be understood and considered to avoid their disabling consequences.

Pinto shows that power and politics are inexorably linked by defining political behavior as "… any process by which individuals and groups seek, acquire, and maintain power." He describes how the organizational, life-cycle, constraint, and stakeholder aspects of the project environment combine to form a fertile field in which power and politics may flourish.

Early on, Pinto differentiates between power and influence, describing the latter as shorter lasting and narrower in scope. He discusses four common means of influencing others: persuasion, ingratiation, pressure, and guilt. Power—which tends to exist on a firmer foundation—arises from position, expertise, information, centrality, and nonsubstitutability. He candidly discusses the dark side of power and suggests ways to expand power that hold to the high road.

Politics receives the same kind of treatment. Pinto begins with a discussion of the three modes of power—authority, status, influence—and follows with a series of definitions of political behavior that is consistently negative. He counters this traditional view with six cogent propositions that define a more neutral path for applying power and politics to achieve project goals.

Such application, though, can be laced with danger. Pinto describes three characteristic approaches: naive (avoid politics), sensible (use politics to further organization goals), and shark (use politics for personal gain at the expense of others). Again, Pinto candidly addresses the realities, discussing 10 practical tools that range from predatory to benign. He does not advocate the use of predatory tools, but rather includes them so that readers may be informed, forewarned, and forearmed. He follows with several short case studies that may strike a chord of familiarity with many readers.

Perhaps the most valuable contribution of this book is in a topic not named in its title—negotiation. If the project disease is people playing political games in a relentless pursuit of personal power, Pinto prescribes negotiation as the cure. He offers advice on when to negotiate and suggestions for developing negotiating instincts. He discusses at length key tips for "principled" negotiations based on Fisher and Ury's 1981 book, *Getting to Yes*, and follows with advice for dealing with problem negotiators.

Pinto comes full circle with a closing discussion of conflict, including sources, processes, and resolution techniques. His final chapter answers the question, "What next?" by describing some specific steps that project managers can take to apply the information previously presented.

Politics is ubiquitous. It exists from the presidency to the PTA. In this kind of culture, *Power & Politics in Project Management* is a unique resource that addresses an often-avoided topic rationally and completely. Like an Internet recipe for an explosive device, the book could be misused by those so inclined. Its value lies in its contribution to those more nobly directed who would integrate and exploit the positive synergy of power, politics, and project management.

This book is available from the Project Management Institute at ***www.pmibookstore.org*** *for $26.35 for members and $32.95 for nonmembers.*

NEWS BRIEFS

Army Develops New Fuel

In February 2000, the Army announced the development of a low-toxicity fuel that ignites on contact (hypergolic) with nitrogen tetroxide or inhibited red fuming nitric acid. Known as Competitive Impulse, Non-Carcinogenic Hypergol (CINCH), the experimental fuel has been in development since 1994 and is a safer all-purpose replacement for a variety of hydrazine and hydrazine-based fuels. A recent test demonstrated that it could be used in satellite launchers that use Aerozine-50, a carcinogenic hypergolic fuel.

"CINCH is extremely versatile and can be used in many rocket propellant applications," said Darren Thompson, Chemical Engineer, U.S. Army Aviation and Missile Command (AMCOM), Redstone Arsenal, AL. "In 1998, CINCH was successfully tested in a monopropellant thruster. Theoretical calculations also indicate that CINCH performs better than RP-1 with hydrogen peroxide or liquid oxygen," he added.

NASA's Marshall Space Flight Center, Huntsville, AL, conducted a preliminary evaluation of the fuel. Edwards Air Force Base, CA, and the Marshall Space Flight Center have demonstration projects planned using hydrogen peroxide and liquid oxygen with CINCH. NASA intends to pursue the use of CINCH with several different oxidizers and as a monopropellant in a satellite launch vehicle. This would greatly reduce logistical costs because only one fuel would be necessary for an entire mission.

Unlike many developmental fuels, CINCH is available commercially. For example, 3M has a pilot plant producing CINCH to meet numerous requests from liquid propulsion developers.

Funding from environmental research organizations has helped advance the development of CINCH. For example, the Army Acquisition Pollution Prevention Support Office funded CINCH research through 1999. Currently, a pollution-prevention joint effort among DOD agencies and NASA is funding the project.

For more information, contact Dan O'Boyle at (256) 876-4162, Public Affairs Office, AMCOM, Redstone Arsenal, AL.

Assessing The Danger From Aging Chemical Rockets

For the U.S. Army Research Laboratory (ARL), Aberdeen Proving Ground, MD, troubleshooting is one of many support areas in which research is often unconventional. Assessing the hazards from the abnormal degradation of 35-year-old solid rocket fuel is no exception.

Background

Roughly 400,000 M55 chemical-agent rockets (each 115mm in diameter) were manufactured and stockpiled during the Cold War years 1961 to 1965. In 1981, these rockets were declared obsolete and scheduled for demilitarization. Although these rockets were built for long-term storage, unforeseen problems have transpired. Specifically, in some instances, chemical agents have leaked from warheads into fuel compartments. The agent-propellant reaction is exothermic and volatile, thus raising the temperature and pressure of the fuel. The question to be answered is whether there is a chance of autoignition in any of these unstable M55 rockets.

The Challenge

The Program Manager for Chemical Demilitarization (PM, CD) was tasked with finding the answer to this question. Working with PM, CD, contractors from Science Applications International Corp. (SAIC) estimated that the rate of energy release from the propellant-agent reaction is likely to be less than 10 watts for the entire 20 pounds of propellant. They concluded that although this seems small (less than the light bulb in most refrigerators), the critical factor is the cooling rate. With sufficient cooling, the temperature rise is inconsequential; however, insufficient cooling could cause the fuel to autoignite.

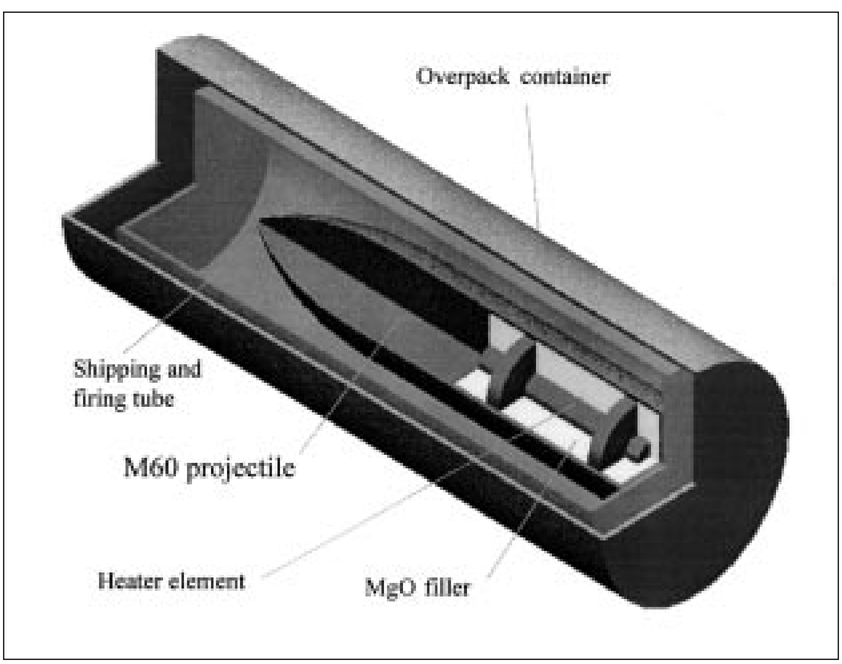
PM, CD called on ARL to design and conduct experimental studies to determine the key cooling rate factor. ARL's Aerodynamics Branch simulated the projectile heating and cooling conditions that could exist in the storage environment (magazine) of unstable M55 rockets and collected data over an extended time period. The degrading round's potential heat generation was simulated by a low-wattage tubular heater that was designed and fabricated by Thermal Devices Inc. to fit inside the fuel cavity of an M60 training rocket (inert surrogate of the M55). Granular magnesium oxide (MgO), having virtually the same thermal conductivity as rocket propellant, was poured around the heater to fill the void between the heater and the fuel compartment walls. Heat was thus conducted to all parts of the rocket motor case as it would be in the agent-propellant reaction being simulated.

The heater, M60 rocket, and concentric layers of containment canisters (overpacking that would normally surround a leaking M55; see accompanying figure) were instrumented with thermocouples. Several such overpacked M60s were prepared and strategically placed within a palletized stacking arrangement, typical of M55 storage.

Results And Conclusion

In all, 42 heating and cooling conditions were simulated for more than 3,000 hours. From this data, ARL computed heat transfer coefficients that were then used to assess the ordnance hazard. ARL also proposed and demonstrated an infrared imager that could be used to quickly survey the M55 stockpile and identify an unstable rocket via its thermal signature. ARL's collaboration with PM, CD and SAIC served a vital role in determining the properties of aging chemical rockets.

The preceding article was written by Jim Garner, an Aerospace Engineer, and Dr. Mark Bundy, a Research Physicist, both employed at the U.S. Army Research Laboratory, Aberdeen Proving Ground, MD.



M60 with heater and filler simulating an agent-propellant reaction

Mortar Developers Don Helmets

In late 1999, employees from the U.S. Army Tank-automotive and Armaments Command's Armament Research, Development and Engineering Center (TACOM-ARDEC), Picatinny Arsenal, NJ, attended a 1-week mortar familiarization course at Fort Benning, GA, hosted by the U.S. Army Infantry Command (USAIC). The objective was to give the Product Manager (PM), Mortar Systems, ARDEC Mortar Team experience in a realistic environment.

Participants from Picatinny Arsenal, the Army's "lethality center," represented every facet of mortar development and included logisticians, testers, contract specialists, contracting officers, and even an acquisition center branch chief. Attendance at this annual course has grown during the past few years as attendees return to their organizations and recommend it to their peers and superiors as an invaluable experience.

Classroom Training

The first day began with introductions and instruction on the general aspects of mortar operations—how to lay the mortar using the M16 plotting board and reading azimuths on maps, as well as the basic "call for fire." The afternoon included simulated night operations using light sticks and more instruction on mortar laying and the use of the M23 Mortar Ballistic Computer.

The most useful aspect of the classroom instruction was the identification of user needs—what infantry soldiers like and dislike and what they would like to see in the future. Important issues were the need for smaller, lighter equipment and the importance of fielding the Mortar Fire Control System. Classroom information was designed to provide a summary of mortar description, operation, and fire control.

Field Experience

The course instruction shifted outside to the field the following day, where participants got their hands dirty and experienced day-to-day mortar training operations.

The instruction, conducted at Fort Benning's Shelton Range, included hands-on training for deflection/elevation changes, aligning aiming posts, reciprocal laying, and boresighting, using operational Army equipment instead of training aids. Participants learned detailed misfire procedures (how to safely remove a live round that is stuck in a tube) and familiarized themselves with the M880 Short-Range Training Round. They also set up the M303 training barrel insert from which the M880 is fired. This was practiced on both 120mm mortar versions—the tracked carrier (M1064A3; basically an M113 personnel carrier with a mortar in it) and the ground-mounted version.

The highlight of the entire course was live firing of M933 120mm high-explosive and 120mm illumination rounds. Participants donned helmets, flak jackets, and ear protection and had the opportunity to hear and feel real ammunition being fired. To prepare for this experience, refurbishment and firing of the M880 with the M303 81mm insert was conducted and all safety procedures were reviewed. Participants handled an inert 120mm round to get a feel of hanging and dropping this much heavier round. They also executed the misfire procedure using the M120 ground-mounted mortar.

The afternoon instruction was conducted at the Red Cloud Range, where participants fired at surplus M48 tanks. To get the full experience, participants were taken through the entire operational procedure from removing the rounds from their packaging, setting the fuze, "cutting" the propellant charge, to firing live ammunition downrange. An evening demonstration of illumination rounds showed the dramatic impact on the battlefield provided by the 120mm mortar.

The course was well planned and executed by the training staff. In particular, they paid attention to detail and allocated plenty of time to respond to any questions and issues regarding military training and mortar equipment operation. "Their attention to detail and safety allowed us to grasp the mortar materiel and live fire ammunition with confidence," said one participant. "This is definitely an impact course and should be a requirement for all materiel developers involved with PM, Mortars [PM, Mortar Systems] or IOC [Industrial Operations Command] mortar programs," he added.

The 120mm illumination cartridge sits atop packaging ready to be fired at Red Cloud Range at Fort Benning, GA.

"We now have a better understanding of the training issues and warfighting issues associated with the deployment of the mortar systems that we buy right here at TACOM-ARDEC," wrote Harry Santa, Group Manager, Mortars and Warheads Contracting Group, Picatinny Center for Contracting and Commerce, in a recent trip report.

"This is truly a model program for the entire Army to follow. It is another way to bring the Acquisition/Materiel development community closer to the "USER" community—The Soldiers."

"Knowing that the materiel developers need to get side by side with the combat developers has provided us with some of the best practical training that I have taken in my 16 years with the government," said James L. Wejsa, Developmental Project Officer, Mortar Smoke and Illuminating Cartridges.

"My three new mortar engineers did not want to leave because they had such an overwhelming experience setting up mortar weapons and handling and firing live mortar cartridge," he said. "I told them they would have to join the Army if they wanted to stay."

Conclusion

How can you get a better endorsement for a job well done by the USAIC mortar staff? The PM, Mortar Systems, ARDEC Mortar Team now has a deeper insight into the challenges a mortarman faces.

PM, Mortar Systems and the USAIC took the initiative to develop a mortars indoctrination program for the PM, Mortar Systems, ARDEC Mortar Team. The purpose was to put them in the boots of the combat infantryman. The result was a head-in-the-helmet, hands-on-the-ammo, weeklong mortar familiarization and live-fire training course for managers and technical staff. The acquisition community is now better informed and motivated to provide the best quality product to its customer—the soldier—having, for a short time, walked in the soldier's boots.

The preceding article was written by Patricia L. Felth, Deputy PM, Mortar Systems.

Body Scanner Helps Create Perfect-Fitting Uniforms

Researchers at the U.S. Army Soldier Systems Center, Natick, MA, are working to create virtually perfect-fitting equipment and clothing. Using a 3-D body scanner called the Whole Body Digitizer, researchers can retrieve between 20 and 30 measurements of the human body in about 30 seconds. The measurements can be used to fit soldiers with properly sized or custom-made uniforms, body armor, and chemical protective suits and masks. Produced by Cyberware in Monterey, CA, Natick's scanner is one of only eight in use around the world.

Anthropometry is the study of body measurements, especially variations within the general population. The Army's anthropometric database is being updated using data gathered from the body scans. Through a better understanding of the wide range of sizes and shapes among soldiers, researchers and designers seek to improve the design, fit, and sizing of military clothing and equipment.

The laser scanner works in the same manner as magnetic resonance imaging (MRI) technology, only the low-powered lasers in the Whole Body Digitizer do not penetrate the surface, said Dr. Brian Corner, Research Anthropologist.

A horizontal laser line is projected onto the subject and reflected onto a photoelectric panel. This process generates mathematical data that is sent to a computer to create a series of spatial reference points. The computer enhances the image by connecting the points, which then becomes a digital model of the subject's body surface. Scientists and engineers can manipulate the 3-D model through computer-aided design and engineering software.

According to Corner, the digitizer can also measure subjects that are difficult to quantify through conventional measuring methods. For instance, the digitizer and its software can measure the air trapped between layers of protective clothing. "When you wear a chemical or thermal protective garment, the air that is trapped between layers adds a certain amount of protection. One of the things we want to know is how much air is in the gap. We can measure the trapped air through scanning and then run tests to determine how much air provides optimal protection," Corner said.

The scanner can also create solid models for display on the computer screen. An item like body armor can then be manipulated onscreen to see if it provides better coverage with longer sides or a shorter front.

The Whole Body Digitizer can improve Army clothing inventories by having the correct sizes for everyone. Recruits could be scanned and their information updated annually. On deployments, the Army would have this information either in a central database or on a soldier's "smart card," eliminating the guesswork about uniform and equipment sizes. Smart cards store extensive personal information and are replacing Army dog tags. The Marine Corps is already using a digitizer to measure recruits for dress uniforms at the Marine Corps Recruit Depot, San Diego, CA.

In addition to clothing, the digitizer and software can help develop basic soldier equipment. Researchers could perform virtual fittings on soldier items like backpacks. For example, researchers can view onscreen how a soldier's load shifts when they lean forward, then design a backpack that adapts to a soldier's mobility. Researchers can also learn whether equipment accommodates different-sized soldiers.

Although Natick currently uses the scanner for improving soldier equipment and clothing, the Whole Body Digitizer has other applications. According to Steve Paquette, Natick's Anthropometry Group Leader, scanning was used successfully by medical professionals to create better fitting artificial limbs, as well as garments and masks for burn victims. Other medical uses include postoperative analysis of wound healing and preoperative assessments of facial features.

Corner said the scanner also has e-commerce applications. "Once an individual is scanned, we have a virtual version of that individual. You can take all kinds of measurements from this virtual individual. You could send this scan to a clothing retailer and then the retailer could come up with your correct size, since sizes can vary by retailer, and have it on record for future orders. The technology could also be used for custom-sizing," he said.

Corner said there is commercial interest in the scanner for use in creating cyberart and computer animation. Operators can scan a person and animate the resulting model.

Natick is part of the U.S. Army Soldier and Biological Chemical Command (SBCCOM). For more information about SBCCOM or the Soldier Systems Center, contact **http://www.sbccom.army.mil**.

Modeling For Manufacturing At Rock Island Arsenal

"If a picture is worth 1,000 words, then a good model is worth at least 10,000." This has become the unofficial motto of the employees at Rock Island Arsenal's (RIA's) Engineering Services Directorate. RIA's modelers can turn out solid and virtual models of any of the numerous items produced at RIA.

As a center in technical excellence for weaponry and support equipment, RIA manufactures gun mounts, artillery carriages, recoil mechanisms, and other equipment for the Armed Forces; and assembles tools, sets, kits, and outfits to support equipment in the field.

RIA's engineering staff can readily produce scaled-down or actual-size models of items ranging from a spare part to an entire weapon system. Process planners, engineers, designers, and others involved in the manufacturing process can study the models and use them to find ways to produce items faster, better, and cheaper.

High-quality models make rapid prototyping possible by putting that which the mind conceives into solid form. Models are also handy for assisting potential customers by supplementing and explaining the information found in drawings, charts, and written descriptions.

Solid models can be made small enough to fit in a suitcase. Detailed virtual models can be sent anywhere in the world via e-mail. With their global reach and universal value, models can integrate internal processes and link customers to the factory floor. When properly used, models can be the glue that holds together the various aspects of manufacturing.

Until recently, the state-of-the-art in solid modeling at RIA was the lamination object machine (LOM). Models can use the LOM to turn out highly accurate 3-D bonded and stacked-paper representations that have a woodlike appearance and can be used as a basis for manufacturing. While the LOM is still in use and will continue to play an important role in solid modeling, it has been supplemented by a new machine that produces plastic models.

The machine is called a 3-D printer, even though its medium is plastic rather than paper. Within a space measuring 8 by 8 by 12 inches, the machine automatically injects and shapes hot plastic to produce models detailed to within a resolution of .013 inches.

Modeling information can be fed into the 3-D printer from any workstation on RIA's computer-aided design (CAD) network. A few mouse clicks can then transform a model that was made using CAD into solid reality.

While the LOM has excellent resolution and can produce one-piece models measuring 32 by 22 by 20 inches, the 3-D printer is much faster and easier to use. Solid models can be turned out of the 3-D printer in 1 hour or less while the most detailed models can take up to 40 hours. Because the 3-D printer can operate unattended, those jobs can be programmed to run over a night or weekend.

Although nothing compares to a good solid model, advances in CAD technology have made virtual models more realistic than ever. Using the latest CAD hardware and software, modelers using a "spaceball" can view and manipulate models from any angle. Modelers can also color-code different parts or classes of parts. Models can be moved and examined for "interferences," those points where two parts rub against each other. Manufacturing process adjustments can then be made.

This technology makes moving from model to manufactured item possible, but what about the reverse? This process, commonly known as "reverse engineering," has become easier and more accurate thanks to a 3-D portable digitizer arm. The tip of the digitizer arm can be moved over an item's surface. As it travels, the arm scans and plots all the points that it crosses.

After processing, the data gathered through the 3-D digitizer arm can be converted into a CAD model, which can then be made into a solid model. The digitizer arm gathers enough data to create models that are accurate to within .003 of an inch.

More information on RIA modeling and engineering capabilities can be found at **www.ria.army.mil**.

Fiber-Optic Cable To Be Installed At Yuma Proving Ground

The extensive data requirements of weapon systems and munitions testing in the 21st century are being addressed head-on at the U.S. Army Yuma Proving Ground (YPG), AZ. At a dedication ceremony May 2, 2000, at Kofa Firing Range, the Army formally kicked off a project that will result in more than 600 miles of buried fiber-optic cable linking test facilities throughout the 1,300-square-mile range area.

The fiber-optic network, called the Range Digital Transmission System, will overcome a number of current limitations caused by antiquated equipment, congestion of radio frequencies, and the use of several data transmission systems. Some of the copper cable being replaced was installed nearly 40 years ago and is not capable of properly transmitting modern test data. The new system will allow automated and integrated voice, data, and video transmissions over a single transport system.

A major benefit of the project is that more extensive data requirements of upcoming tests will be easily met. Also, the time required to connect equipment at test sites will be dramatically reduced because workers will need only to plug in to the already installed fiber-optic system rather than lay new cable or use microwave transmitters.

Construction of the system, performed by contract personnel, will take 6 years at an estimated cost of $50 million. When completed, the system will link 400-plus test sites at YPG.

"This is one of the most significant forward steps I've seen at YPG," said YPG Commander COL Robert Filbey. "It will pay big dividends in years to come because of our significantly improved ability to acquire and move test data. This is the key to efficient testing in our information age. We've now graduated from copper wire and microwave data transmissions to fiber optics. This is clearly the next generation," Filbey added.

Burying the first length of fiber-optic cable. Shown left to right are COL Mark Russell, Project Manager for Instrumentation, Targets and Threat Simulators; Arizona Representative Jim Carruthers; COL Robert Filbey, Commander, YPG; and COL John Deal, Commander, Information Systems Engineering Command.

COL John Deal, Commander of the Information Systems Engineering Command, Fort Huachuca, AZ, said that there will be many lessons learned during this project that will be applied at other military installations. He added, "This project isn't just about Yuma—it's about digitizing the force, testing new technologies that are coming out at an incredibly rapid rate, and creating a template that we can adapt and distribute at other test ranges around the Department of Defense. My most immediate concern is the digitizing of Yakima Range, WA, which has terrain very similar to Yuma Proving Ground."

Digitizing a range is important because of the vast amount of equipment that can be used to gather data and the ultimate correlation of these data. Digitization allows engineers to manipulate and cross-correlate information much better than they could in the past.

"No one will let Yuma Proving Ground sit still after this great fiber-optic capability is installed," claimed Deal. "People will take advantage of and exploit this instrumentation capability—it will be great for the proving ground," he added.

At the project's dedication ceremony, Arizona Representative Jim Carruthers stated that fiber-optic capability will create a new communication threshold for YPG, which is exactly the state-of-the-art transmission capability that will make YPG even more valuable to future national Defense concerns. "Yuma Proving Ground is essential to keeping America free," said Carruthers.

As a part of the Army Test and Evaluation Command, YPG's primary mission includes testing medium- and long-range artillery, aircraft armament and fire control systems, cargo and personnel airdrop systems, and armored vehicles and automotive equipment. Last year, more than 167,000 rounds were fired, 36,000 parachute drops were made, and nearly 4,000 air sorties were flown at the installation.

The preceding article was written by Chuck Wullenjohn, Public Affairs Officer, U.S. Army Yuma Proving Ground.